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RUDOLF VIRCHOW—ANTHROPOLOGIST AND ARCHEOLOGIST¹

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RUDOLF LUDWIG KARL VIRCHOW was born in the little Pomeranian town of Schivelbein, on October 13, 1821. He died on September 5, 1902. His parents were people in moderate circumstances, his father combining the occupation of a farmer with that of a retail merchant. The young Virchow received his early education at the parochial school of Schivelbein, with special instruction from the local clergymen. He then entered the gymnasium at Köslin, from which he graduated in 1838 at the age of seventeen.

At the gymnasium he followed the regular classical program of studies, but showed at the same time great enthusiasm for the natural sciences, history and geography. He acquired and retained throughout life a remarkable accuracy in both Greek and Latin, and in his later years upon several occasions mercilessly criticized the barbarisms which the younger generation attempted to introduce into medical terminology. This same attention to accuracy of details characterized Virchow's work in every field, and gave him the perfectly astounding mass of information which rendered him such a deadly critic of unstable hypotheses. In addition to the study of the classics, Virchow found time at the gymnasium to read widely in the French and German classics. Italian and English he acquired later. It is interesting to have his reflections upon suitable courses of study for the gymnasium, expressed in an address delivered when rector of the University of Berlin. He maintained that, as a preparation for scientific work, a course in mathematics, philosophy and the natural sciences would have equal value with a classical course, but that the later could not be replaced by the modern languages.

From the gymnasium at Köslin, Virchow proceeded to the Royal Medico-Surgical Friedrich Wilhelm's Institute at Berlin. Here he qualified for the doctorate in 1843. In connection with his inaugural dissertation, Virchow defended, among other theses, two which he afterwards looked upon as showing the early ripeness of his intellect and the breadth of his interests. The first of these ran *nisi qui liberali-*

¹A paper read at a meeting of the Research Club, University of Michigan, April 20, 1921, in commemoration of the centennials of Hermann von Helmholtz and Rudolph Virchow.

bus rebus favent veram medicinae indolem non cognoscunt (Those who do not encourage progress do not grasp the true nature of medicine); the second was an application of Agassiz's then recently published glacial theory to Pomerania *Pomeraniae petrificata glacie primordiali disiecta*. To Virchow there might fittingly be applied the saying, *homo sum, et nihil humanum mihi alienum puto*. His ability to connect science with life as a whole and his interest in everything pertaining to life led him from the investigation of the dead to that of the living man, from craniology to ethnology and to the history of civilization, as well as from the laboratory into the political arena.

In full conformity with this attitude towards life was Virchow's report upon the typhus epidemic in Silesia, published in 1848. Here he showed that the source of the epidemic was to be found in the backward social and political conditions of Silesia, and made radical suggestions for their amelioration. The championship of the people which he thus assumed he maintained throughout a long political career, as a member of the Prussian House of Representatives, from 1862 to 1878; of the Reichstag, from 1880 to 1893; and of the municipal council of Berlin for 42 years. He was a founder of the progressive party (*Fortschrittspartei*), and a firm opponent of Bismarck's imperialism, being honored by the latter with a challenge to a duel. He fought unceasingly for the improvement of the education as well as the social conditions of the masses, and the term *Kulturkampf* was an outgrowth of his political manifestoes. But, at the close of his life, it was Virchow's boast that, although he had devoted himself to both politics and medicine, he had always succeeded in preserving for science its independence of political influences.

While a professor at the University of Würzburg (1849-56), Virchow published two studies on cretinism in Lower Franconia and pathological skull forms (1851-2). These may be taken to mark the beginning of his anthropological work, and were the first of more than one thousand publications in this and allied fields. They were followed (1857) by his "Investigations on the Development of the Base of the Skull in Healthy and Diseased Conditions, and on the Influence of the same upon Skull Form, Facial Structure and Brain Formation." In this treatise he laid the foundation for an anatomical treatment of craniology, pointing out as the problem for investigation the relationship between the shape of the skull, the facial structure and the formation of the brain. His conclusion was that all typical variations in facial structure rest chiefly upon differences in the formation of the base of the skull.

For about a decade following his return to Berlin in 1856, Virchow's main interest and activity lay in the field of medicine. Then he began to turn his attention in an ever increasing degree to anthropological and allied studies, upon which he entered with all the enthusiasm of a true

pioneer. In 1869, mainly through his efforts, was organized the Deutsche Anthropologische Gesellschaft. In the same year he founded the Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte, and its organ the *Zeitschrift für Ethnologie*. In addition to directing the publication of the *Zeitschrift*, he was also an editor of the *Correspondenzblatt* of the Anthropologische Gesellschaft and, from 1870, of the *Archiv für Anthropologie*. The degree to which these new fields absorbed Virchow's activities may be gathered from the fact that, although it was as a pathologist that he was elected to the Royal Academy of Sciences at Berlin in 1874, only three of his numerous papers read before the academy dealt with problems of pathology, while nearly all the rest discussed anthropological subjects.

Passing from the study of the diseased to that of the normal skull, in 1874 Virchow presented the results of his attempts to find ethnographic skull characteristics in an article entitled "On Some Characteristics of the Skulls of the Lower Races of Man." Here he advanced the generally accepted view that the frontal projection of the squamous portion of the temporal bone is a pithecoïdal characteristic, much more frequent among non-Aryan than Aryan peoples; and that the unproved, but certainly to be suspected, defective formation of the temporal brain parts as a result of this frontal projection permits us to see in the latter, and in the bare narrowing of the temporal area, a mark of lower, but not necessarily of the lowest, races.

Virchow's next efforts were directed towards the determination of the skull types of European races. Here the prevailing view was that of Retzius: that each of the great racial divisions had a single type of skull and that peoples must be differentiated as either dolicocephalic or brachycephalic. Virchow took a more cautious attitude and opposed the selection of type skulls "until the whole breadth of individual varieties was known." He also combatted Nilson's theory that an original brachycephalic European population had been overrun by a dolichocephalic element which stood upon a higher plane of physical and mental development, *i. e.*, the Celts and the Germans.

In 1875, Virchow declared it impossible to establish definite cranio-logical types for Germans, Celts, Slavs, Finns or Italians; that the postulate of originally pure and homogeneous great culture races is erroneous, and that all these have been formed by a mixture of smaller elements, a view which now receives general acceptance. Then, in the following year, in his "Contributions to the Physical Anthropology of the Germans," he claimed that even greater weight should be laid upon the height of the skull than upon its length or breadth, and he was able to show that the old German cranial type, as represented by the Frisians, were chamaeprosopic and mesocephalic rather than dolichocephalic as had been maintained heretofore.

The scope of Virchow's anthropological studies widened until he sought to give an exact descriptive basis for the natural history of man. Hence he directed his investigations toward living peoples, as well as toward those which are now extinct, and entered upon the field of ethnology. One great result of his efforts was the census of the school children of the German Empire, taken from the point of view of racial physical characteristics. This census brought out the fact that the historic characteristics of the old Germanic type—blond hair, white skin and blue eyes—were to be found united in only approximately one third of the population of Prussia and one fifth of that of Barvaria. Perhaps in this connection one should mention Virchow's establishment in 1888 of the Museum for German National Costumes and Products of Household Industry, at Berlin.

Carrying his investigations outside of Germany, Virchow compiled anthropological analyses of the Lapps, Eskimos, Patagonians, Terra del Fuegians, Kaffirs, Australians and Malays. One of his most interesting studies was that of the population of Ceylon, in which he established the nanocephalism and racial purity of the Veddas, as well as their relationship to the older Dravidian or pre-Dravidian population of India, while showing that the Cingalese, on the contrary, were a mixed race.

Virchow continued his craniological studies with unabated zeal until the time of his death, when his collection comprised some 4,000 skulls, ancient and modern, coming from all quarters of the globe. Yet he had to acknowledge his inability to attain a satisfactory craniological differentiation of races, or an explanation of how various skull types arise among the same people. He gave great attention to the development of more exact methods of craniological measurements, and helped to bring about the adoption of standard systems in this field. Another beneficial result of his work in this field was the exclusion of pathological forms from the list of skull types. Here it may be mentioned that he maintained that the celebrated Neanderthal skull exhibited pathological characteristics, and consequently protested against the acceptance of a distinct racial type upon the evidence of this single specimen. But in this he failed to win the support of the majority of anthropologists.

In addition to studies upon Illyrian, Trojan, Cyprian, Moroccan, East African, Ancient and Modern Greek, and Philippine skull types, Virchow published a work on American racial skulls—*Crania Ethnica Americana*—noteworthy both for its descriptive details and for its differentiation of pathological deformities of the skull from artificial deformities resulting from accident or intent. His examination of the remains of the Java ape-man—*pithecanthropus erectus* Dubois—led him to the conclusion that it did not belong to the genus *homo*, but was a gibbon of an extinct species, a view which now finds little acceptance.

It was inevitable that Virchow should be attracted by the basic problems of anthropology and biology, such as the origin of species and the place of man in the natural world. And it was natural that his point of view in these questions should depend upon his belief in the identity of physiological and pathological processes. His formula was: Individual and type equal pathology and physiology. Towards the Darwinian theory of evolution he was by no means hostile, but exhibited the same cautious attitude as in other anthropological questions. He held that there was a great gap in our knowledge, namely, in regard to the development of the human from the lower forms of life. For the time this gap may certainly be filled by an hypothesis, for only by hypotheses can the path of research in unknown fields be marked out. Such a hypothesis, Virchow felt, Darwin had supplied in the finest sense of the word. "It was an immeasurable advance," he declared, "which living Nature made when the first man developed from an animal, whether that was an ape or other creature, which was the racial ancestor of the ape as well. However, the actual proof of the descent of man from the ape has not yet been made. None of the known apes supplies the transitional stage." Still the theory of the descent of man was for him, "not only a logical, but also a moral postulate," whose value lies not in being a new dogma, but a light for further research.

His attitude came to light clearly in his famous controversy with Haeckel, in 1887, when the latter demanded that his monistic doctrine be introduced into the schools. Virchow objected strenuously to the teaching of the problems as though they were the conquests of science, taking the ground that this was contrary to the conscience of the natural scientist, who reckons only with facts. He likewise protested vigorously against any form of compulsion of conscience.

In approaching the problem of the origin of species, Virchow saw more hope of attaining a solution through physiology and pathology than through morphology, which gives only the possibility and not the proof of evolution. "He who teaches us," he wrote, "to develop a Schimmelpilz out of a Spaltpilz will have accomplished more than all the heralds of the geneological tree of man."

In his "*Rassenbildung und Erblichkeit*" (1896), he developed his doctrine of the pathological nature of variations from type. Originally each species, or variation from type, is produced by a permanent disturbance of the parental organism, and is in this sense pathological. Only by inheritance in the descendants does this condition become physiological: but, up to now, it is completely unknown why one disturbance is inherited, another not. Races, too, are only hereditary species, which rest upon a pathological disturbance in the parental organism. Probably in most cases the disturbance is produced by the environment, but often also by causes contained within the organism, which become effective only after birth.

Virchow's general interest in historical questions and his special anthropological studies led him into the field of prehistoric archeology. To this study, in Germany, he did a great service by raising it from dilettantism to a recognized position among the social sciences. He was early attracted by the history of his birthplace, Schivelbein, and, in 1866, wrote on its antiquities. From 1867 onwards, he became a regular participant in the international congresses for prehistoric archeology and anthropology. In 1869, he began his investigations of North German pile dwellings. A careful study of ceramics enabled him to determine that these pile dwellings were of later origin than the corresponding structures in South Germany, and, on the basis of similar evidence, he showed that the so-called Wendish cemeteries were really pre-Slavic in origin.

Becoming interested in the question of the mutual influences of prehistoric cultures, Virchow made an exhaustive study of the ancient amber and flint traffic routes in Central Europe. It was largely as a result of a friendship formed in 1875 with the Homeric enthusiast Schliemann that Virchow extended his archeological studies beyond the limits of his native country. In 1879 he accompanied Schliemann to the site of ancient Troy, in 1881 to the Caucasus, and in 1888 to Egypt, Nubia and the Peloponnesus. It was Virchow's influence that induced Schliemann to entrust his later excavations at Troy to the experienced archeologist Dörpfeld.

Virchow's expedition to the Caucasus was undertaken in the hope of finding there the source of the European bronze age culture, but in his report on the Graveyard of Koban (1883) he decided against the possibility of this theory. One important result of his work in Egypt was that he was the first to adduce positive evidence for a period of neolithic culture in the Nile Valley.

His Caucasian studies led Virchow to encourage others to interest themselves in the origins of the civilization of the Near East, and through the work of his pupils the civilization of the ancient kingdom of Colchis was revealed. Shortly before his death, Virchow had assumed the honorary direction of a new German Society for the Investigation of Asia Minor, especially Anatolia and Cappadocia.

In these closely related fields of anthropology, ethnology and prehistoric archeology, Virchow's fame rests not so much upon the infallibility of his own conclusions as upon his introduction of scientific methods of investigation, his establishment of organizations for co-operative effort in research, his logical and independent thinking and his deep sense of truth. A great worker himself, he stimulated the work of others, not only in his own country, but also abroad, and so became, in the best sense of the word, an international figure.